

CLAIMS

1. A porous silicate granular material, especially as aggregate for the production of construction materials such as lightweight concrete, mortar or heat-insulating plaster containing glass and a glassy-crystalline component comprising
45 to 85 wt.% SiO_2 ,
5 to 20 wt.% alkali oxide,
5 to 30 wt.% alkaline earth oxide and
2 to 30 wt.% of other oxides such as Al_2O_3 and/or Fe_2O_3 , whereby the glassy crystalline component accounts for 5 to 75 wt.% of the granular material, characterised in that the glassy crystalline component is the sinter reaction product of a mixture of
quartz powder and/or another essentially pure fine-grained SiO_2 carrier,
powdered clay and/or powdered clay mineral,
Portland cement,
caustic soda and
an expanding agent as at least one additive.
2. A method for producing granular material according to Claim 1, characterised in that
- a mixture of
powdered glass,
quartz powder and/or another essentially pure fine-grained SiO_2 carrier,
powdered clay and/or powdered clay mineral,
Portland cement,
caustic soda,

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an expanding agent and
water

and if necessary other additives and/or accessory
agents is prepared,

- the mixture is agglomerated at a temperature of 20 °C to 150 °C at normal pressure with the water vapour partial pressure being adjusted, selected or controlled as a function of time-temperature and carbon dioxide being excluded or admitted, whereby the admission of carbon dioxide is controlled by adjusting or selecting the carbon dioxide partial pressure,
- the intermediate product is crushed and graded if necessary,
- the intermediate product thus obtained is heated at normal pressure with the carbon dioxide partial pressure and/or the water vapour partial pressure being adjusted, selected or controlled as a function of time-temperature, to a temperature of 700 °C to 1250 °C and sintered and expanded at this temperature.

3. The method according to Claim 2, characterised in that after agglomeration the mixture is put into intermediate storage and then dried and/or heat treated.
4. The method according to Claim 3, characterised in that the mixing, agglomeration, intermediate storage, drying and/or heat treatment takes place with carbon dioxide being eliminated or admitted, whereby the admission of carbon dioxide is controlled by adjusting or selecting the carbon dioxide partial pressure.

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5. The method according to Claim 4, characterised in that the mixing, agglomeration, intermediate storage, drying and/or heat treatment takes place with the water vapour partial pressure being adjusted, selected or controlled as a function of time-temperature.
6. The method according to Claim 2, characterised in that powdered glass, quartz powder and/or another essentially pure fine-grained SiO_2 carrier having a grain size of $< 40 \mu\text{m}$ is used.
7. The method according to Claim 2, characterised in that during preparation of the mixture silicate, oxide, hydroxide, carbonate and/or sulphate materials are added as additives and/or accessory agents.
8. The method according to Claim 2, characterised in that during preparation of the mixture water glass solutions, filter dust, ground slag, powdered ceramic, quicklime, hydrated lime, powdered limestone, gypsum, anhydride, powdered corundum, aluminium hydrate and/or oxides, hydroxides, carbonates and sulphates of alkalis and alkaline earths are added.
9. The method according to Claim 2, characterised in that a mass fraction of the granular material originating from additives and/or accessory agents as end product is a maximum of 20 wt.%.

10. The method according to Claim 2,
characterised in that carbon and/or carbon carriers
such as soot, powdered graphite, powdered coal,
fine-grained silicon carbide and carbohydrate are
used as swelling agents.
11. The method according to Claim 2,
characterised in that the mixture is adjusted as a
doughy pasty mass and then agglomerated.
12. The method according to Claim 2,
characterised in that the mixture, especially in the
form of a doughy pasty mass is subjected to heat
treatment.
13. The method according to Claim 12,
characterised in that the heat treatment is provided
by Joule heat via an ac power supply.
14. The method according to Claim 12,
characterised in that the heat treatment takes place
by supplying microwaves.
15. The method according to Claim 2,
characterised in that the agglomeration is
accomplished by a granulation process or takes place
by pressing.
16. The method according to Claim 2,
characterised in that the sintering and expanding
takes place in a rotary kiln with the addition of a
parting compound.

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17. The method according to Claim 2,
characterised in that the sintering and expanding of
the intermediate product takes place with the carbon
dioxide partial pressure and/or water vapour partial
pressure of the process environment being adjusted,
selected or controlled as a function of time-
temperature.

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